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Highlights of the Emissions Measurement Center's Activities for 2003/2004

Environmental Protection Agency
Office of Air Quality Planning and Standards
Emissions, Monitoring, and Analysis Division
(www.epa.gov/ttn/emc)

Below are highlight items involving emission test method publication, evaluation, validation, and other **Emissions Measurement Center (EMC)** activities during the past twelve months. The information is organized by publication category or organizational activities.

A. New and Revised 40 CFR Part 60, Appendix A, Test Methods

1. Instrumental Test Methods Revisions - Methods 3A, 6C, 7E, 10, and 20 of 40 CFR Part 60, Appendix A are instrumental methods that we are updating to harmonize equipment and performance criteria. Inconsistent acceptance criteria for performance tests and calibration gas quality are being made uniform. Other improvements address low-concentration measurements and alternative performance evaluating techniques. Revisions to these methods were proposed on October 10, 3003 (68 FR 58838). We expect to promulgate the methods by the end of 2004. **(Foston Curtis 919/541-1063 and Terry Harrison 919/541-5233)**

2. Method 24 Revisions - Method 24 describes procedures for determining the volatile matter content, water content, density, volume solids, and weight solids of surface coatings, typically referencing ASTM procedures for conducting these analyses. In an EPA-sponsored study, we completed a round-robin sampling and analysis evaluation of a new procedure for determining the volatile organic content of water-based coatings and drafted a method revision based on the results. We are now working with the Adhesive Council which is in the process of conducting a round-robin evaluation of a headspace procedure that may prove better for the water-based coatings. Based on the outcome of the second round-robin, we will fine tune the best of the two procedures and propose it as an addition to Method 24 or possibly a separate method in early 2005. **(Candace Sorrell 919/541-1064)**

B. New and Revised 40 CFR Part 60, Appendix B, Performance Specifications for Continuous Opacity and Gaseous Monitoring Systems

1. Performance Specification 11 - Specifications and Test Procedures for Particulate Matter Continuous Emission Monitoring Systems at Stationary Sources (PS-11) - On Monday, January 12, 2004, we promulgated PS-11 for PM

CEMS (69 FR 1786). **(Dan Bivins 919/541-5244)**

2. **Performance Specification 12A- Specifications and Test Procedures for Total Vapor Phase Mercury Continuous Emission Monitoring Systems in Stationary Sources (PS-12A)** - The EMC has completed its field effort to demonstrate the effectiveness of two commercially available mercury CEMS at a coal-fired utility boiler. Using the knowledge obtained during the demonstration, the Agency proposed PS-12A on January 30, 2004 (68 FR 4652) with electric utility MACT rule. Comments are being accepted until March 30, 2004. **(Bill Grimley 919/541-1065)**

3. **Draft Performance Specifications for Predictive Emissions Monitoring Systems (PEMS) (PS-16) -** A draft performance specification is being prepared to provide performance criteria for acceptance of PEMS. PEMS are typically used at facilities whose emissions can be predicted from process parameters such as combustion processes (e.g., gas turbines and internal combustion engines). Predictive systems are an emerging technology and EPA is incorporating their use in recently-promulgated rules and allowing them at a number of regulated facilities. We expect to propose PS-16 in the Spring of 2004. **(Foston Curtis 919/541-1063)**

4. **Draft Performance Specifications and QA/QC for Continuous Parameter Monitoring Systems (PS-17)** - Our newer emissions standards (e.g., MACT and NSPS) frequently include requirements for monitoring of process or control device operational parameters and for having the operator to stay within site-specific or rule-specific operating ranges. We recognized the need for performance specifications for installing, operating and maintaining these parametric monitoring systems (e.g. temperature, pressure, pH, liquid flow, conductivity) and have begun work on drafting performance specifications and quality assurance requirements. We expect to have documents ready for proposal and public review in late 2004. **(Barrett Parker 919/541-5635)**

C. New and Revised 40 CFR Part 60, Appendix F, Quality Assurance Procedures (for Continuous Monitoring Systems)

1. **Procedure 3 - Quality Assurance Requirements for Continuous Opacity Monitoring Systems at Stationary Sources** - As a result of the comments received after re-opening the comment period for the rulemaking formerly known as "Method 203," which includes requirements for ongoing quality assurance and quality control evaluations of COMS used as continuous compliance monitoring systems, we decided to form a stakeholders' group to undertake the task of re-writing this rule package. The stakeholders' group was comprised of opacity monitor manufacturers, State/local agencies, EPA region personnel, as well as representatives from owners/operators. Method 203 has been rewritten as Procedure 3, and was re-proposed as an addition to 40 CFR part 60, appendix F in the Federal Register on May 8, 2003 (68 FR 24692); we expect to promulgate it

sometime this summer. **(Solomon Ricks 919/541-5242)**

2. **Procedure 2 - Quality Assurance Requirements for Particulate Matter Continuous Emission Monitoring Systems at Stationary Sources -** As an accompaniment to PS-11 for PM CEMS we have also promulgated ongoing quality assurance and quality control requirements for using PM CEMS as continuous compliance monitoring systems (69 FR 1786, 1/12/04). **(Dan Bivins 919/541-5244)**

D. New and Revised 40 CFR Part 63, Appendix A, Test Methods

1. **Method 301** - Method 301 is the field data validation protocol promulgated on December 29, 1992. The method provides a framework and performance criteria for validating emissions test data (and methods) when no EPA method is available or when proposing an alternative to an existing test method. Comments and questions from the user community have prompted preparation of technical revisions and clarification to the method. We are drafting revisions to Method 301 to address limiting the use of correction factors to data when testing other sources, as well as procedures for evaluating alternatives to existing reference methods including allowing use of spiking procedures in lieu of comparison testing. We are plan to add a discussion of detection limits, delete the practical limit of quantitation procedure, tighten the acceptable precision limits, and correct deficient equations and other technical errors. The proposal package for the revisions is scheduled to go to the Administrator by September 2004. **(Gary McAlister 919/541-1062)**

2. **Method 323-Measurement of Formaldehyde Emissions from Natural Gas-Fired Stationary Sources - Acetyl Acetone Derivatization Method** - We proposed the industry-developed acetyl acetone colorimetric method (first published as CTM-037) for formaldehyde as part of the combustion turbine MACT in on Tuesday, January 14, 2003 (68 FR 1925). It utilizes a chilled midget impinger train for sampling. It was promulgated with the turbine MACT on Friday, March 5, 2004. **(Terry Harrison 919/541-5233)**

3. **Method 324-Determination of Vapor Phase Mercury Emissions from Stationary Sources Using Dry Sorbent Trap Sampling** - As part of its field effort to demonstrate the effectiveness of commercially available mercury CEMS at a coal-fired utility boiler, EMC also evaluated a long-term integrated testing method using dry sorbent trap sampling. This method was proposed along with PS-12A on January 30, 2004 (68 FR 4652) as part of the electric utility MACT. Comments are being accepted until March 30, 2004. **(Bill Grimley 919/541-1065)**

E. Conditional Test Methods (CTM) - These methods, which are published on the EPA website at: www.epa.gov/ttn/emc, have been evaluated by EPA and may be applicable to one or more categories of stationary sources. The EPA confidence in a CTM is based upon review of technical information including field and laboratory validation studies. EPA understanding of the most significant quality assurance (QA) and quality control (QC) issues; and EPA confirmation that the method addresses these QA/QC issues sufficiently to identify when the method may not be acquiring representative data. For State and local programs to use a CTM for Title V permits, State Implementation Plans (SIP), etc., they must be subject to an EPA Regional SIP approval process or permit veto opportunity and public notice and comment; CTM may be used without EPA oversight for other non-Federal applications including state permitting programs and scientific/engineering studies. For a source to use them to meet Federal requirements under 40 CFR Parts 60, 61, and 63, A CTM must be approved as an alternative test method.

1. **CTM-035 SCAQMD Method 25.3 - Determination of Low Concentration Non-Methane Non-Ethane Organic Compound Emissions From Clean Fueled Combustion Sources** - The South Coast Air Quality Management District (SCAQMD) requested that we consider their Method 25.3 as an alternative to EPA Method 25 for measuring non-methane organic compounds in municipal solid waste landfill gases. The SCAQMD Method 25.3 is a GC/oxidation/reduction FID-based procedure using tank and condensation trap sampling. The SCAQMD has validated the method for measuring emissions from landfill gas incinerators between 1 and 50 ppm. We have reviewed the method and validation data and subsequently posted it as a CTM in April of 2000. **(Foston Curtis 919/541-1063)**

2. **CTM-036 Method for Measurement of Toluene Diisocyanate (TDI) and Methylenediphenyl Diisocyanate (MDI) Stack Emissions** - This method was submitted by Bayer Polymers, LLC along with laboratory and field validation data. We reviewed the method and validation data and subsequently posted the method as a CTM in April of 2000. In February, we received additional data from Bayer in support of application of the method to additional compounds (1,6-hexamethylene diisocyanate (HDI), HDI biuret, HDI trimer, and isophorone diisocyanate (IPDI)); we are in the process of reviewing it and will make additions/modifications to CTM-036, as appropriate. **(Gary McAlister 919/541-1062)**

3. **CTM-038 Conditional Test Method for Measurement of Ammonia Emissions from Highway, Nonroad, and Stationary Use Diesel Engines by Extractive FTIR** - The Institute of Clean Air Companies (ICAC), a consortium of equipment manufacturers, proposed to EMC a method for measurement of ammonia and other vapor phase organic and inorganic emissions from diesel engines. The ICAC subjected the procedure and the equipment to testing under EPA's

Environmental Technology Verification program the result of which indicated an acceptable level of performance for the purpose intended. We have reviewed the draft method, made improvements in several areas and posted it as a CTM in March of 2003. **(Barrett Parker 919/541-5635)**

4. **CTM-039 Measurement of PM2.5 and PM10 Emissions by Dilution Sampling (Constant Sampling Rate) -** The National Academy of Sciences recommended that the EPA develop a source method for use by States that uses air dilution to condense the PM. We have identified the need to develop a test method that will characterize the source emissions for both mass (total, PM10 and PM2.5) and the chemical species measured by the ambient air monitoring network. The state-of-the-art collection device that we have developed includes combination cyclone separators, a modular denuder filter pack assembly to remove gases that may create artifacts, as well as several in-series filters (quartz, Teflon, nylon, etc.). During 2002, we field tested this method at three sites and made modifications based on these results. In June of 2003, we posted the method as CTM-039 on the EMC web site. Also available on the website is a Quick Time Movie that provides visualization of the hardware in CTM-039. **(Ron Myers 919/541-5407)**

5. **CTM-041 Determination of Volumetric Gas Flow in Rectangular Ducts or Stacks Taking Into Account Velocity Decay Near the Stack or Duct Walls** - With EPA's Clean Air Markets Division (CAMD) we undertook a project to identify a method suitable for inclusion in alternative method requests by the Part 75 regulated community for flow measurements in rectangular ducts. EPA's current Method 2H, while addressing wall effects in circular ducts, does not address wall and corner equal area flow measurement problems in rectangular ducts. The final evaluation report was reviewed by EMC and CAMD and the candidate method was found to be suitable. It was posted on the EMC website as CTM-041 in December 2003, and can now be used as a common basis for making requests for approval of such an alternative method. **(John Schakenbach 202-564-9158, Bill Grimley 919/541-1065, or Tom Logan 919/541-2580)**

6. **CTM 042 Use of Flame Ionization Detector Methane Cutter Analysis Systems for VOC Compliance Testing of Bakeries** - This method was proposed to EMC by the ICAC for measurement of non-methane hydrocarbons from bakeries and its use is strictly limited to measuring VOC emissions from bakeries. The purpose of this CTM is to provide an alternate method for making real-time non-methane hydrocarbon measurements to assess performance of the VOC destruction device. The method describes the use of a hot flame ionization detector (FID) based instrument equipped with a catalytic methane cutter in conjunction with EPA Method 25A to provide real-time differential measurement of total hydrocarbons, methane and by difference non-methane hydrocarbons. Following EMC technical review, it was posted on the EMC website in December of 2003. **(Gary McAlister 919/541-1062)**

7. **Method for Measuring Sulfuric Acid Emissions from Kraft Pulp Mills** - The NCASI submitted a Method 301 study demonstrating a procedure to measure sulfuric acid emissions from combination boilers and recovery furnaces where there are sulfate salts and sulfuric acid coexisting in the stack; the procedure evaluated is a combination of NCASI Method 8A and EPA Method 8. The important part of the measurement system is an elevated temperature filter in front of the sample collection system. The Method 301 study showed that the filter removed the sulfate salts while allowing the sulfuric acid to pass through unchanged and was collected in a condenser. The NCASI has suggested modifying the train to collect the sulfuric acid in a Method 8 impinger system. 8). If NCASI is interested, we will post the procedure as a CTM later this year. **(Gary McAlister 919/541-1062)**

8. **CPS-001 Design Specifications for Opacity Monitors to be Used Where Opacity Limits Are Less Than 10 Percent -** The purpose of this conditional performance specification is to provide requirements for design of an opacity monitor capable of measuring opacities accurately below 10 percent. CPS-001 relies heavily on PS-1 and ASTM D 6216-98, with revised specifications for supply voltage variation, thermal stability, ambient light, external zero device, upscale calibration device, calibration error, optical alignment indicator, calibration device repeatability, and measurement output resolution. It was posted on the EMC website in September of 2002.

F. Other Emissions Measurement Projects

1. **Development of Optical Remote Sensing Method to Determine Emission Flux from Fugitive Emission Sources** - No standard protocol exists for making measurements of air emission flux from fugitive or nonpoint sources. Current estimation techniques based on emission factors are imprecise and may overestimate. Earlier point measurement or remote sensing approaches that rely on reverse dispersion modeling are prone to modeling errors. This project, begun in 2002, seeks to demonstrate a path-integrated optical remote sensing (PI-ORS) technique utilizing multiple beam paths and optimizing algorithms to yield a time-averaged, mass-equivalent concentration field across a contaminant plume from which, using wind data, the emission rate can be determined. During 2002 and 2003 extensive field validation testing using open path FTIR and controlled releases of various gases was conducted. For this project, funded by DoD's Environmental Security Technology Certification Program, we are serving as a regulatory advisor to the Air Force and its contractor, ARCADIS. We hope to publish a draft protocol for conducting these measurements as a Conditional Test Method or a Preliminary Method in late 2004. **(Robin Segall 919/541-0893)**

2. **Voluntary Superior Monitoring -** In 2003, an EPA cross-divisional team headed

by SMTG/SMAG explored a regulatory option called Voluntary Superior Monitoring, designed to promote the use of improved and more direct emissions monitoring technologies. Under this option, owners/operators of industrial air pollution sources could volunteer to conduct monitoring superior to their current requirements and, in return, EPA would offer incentives such as less record keeping and reporting, more flexibility in control device or process operation, or reductions/elimination of other requirements. This approach proved unfeasible, so we are continuing the project in a different mode. The voluntary superior monitoring team is now looking for opportunities to promote better monitoring in new rulemakings. For example, we have already provided support for states to opt to receive credits for requiring better monitoring from sources of PM fine. This will result in cost effective emissions reductions. **(Tom Driscoll 919/541-5135)**

3. **Stationary Source Audit Program (SSAP)** - EMC has implemented an electronic Stationary Source Audit Program (SSAP) database. Federal, State, Local, and Tribal Agency personnel now use this database to electronically order audit samples. The database compiles the audit results in several report formats that allow the QA Team and Agency staff to review the results of a particular audit. The audit sample results are input into the database by the person who initially requested the audit sample and a pass/fail notice is automatically issued . For security, access to the database is limited to registered Federal, State, Local & Tribal Agency users. **Registration requests can be submitted to Candace Sorrell at the e-mail address or telephone number below.** The request should include name, non-P.O. Box address, Agency affiliation, phone number, and e-mail address and you will receive further instructions via return e-mail. Currently, there are audit materials for Methods 6, 7, 8, 12, 13A and 13B, 18, 23, 24 (inks and solvents), 25, 26, 26A, 29, 101A, and 315. The EMC QA team also conducts teleconference calls on the first Tuesday in every month from 1:30-3:30 pm (EST) to discuss audit and other emission testing issues. Agendas and minutes for these conference calls can be obtained by contacting Candace. **(Candace Sorrell 919/541-1064)**

4. **ASTM Activity** - EMC participates in Subcommittee D22-03 primarily to encourage development of new stack test methods for which we anticipate a future need that is not met by a current EPA method. D6831-02 Standard Test Method for Sampling and Determining Particulate Matter in Stack Gases Using an In-Stack, Inertial Microbalance and D6784-02 Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method) are successful examples falling into this category. We participate in a more advisory level when D22-03 is developing a method for which EPA already has an acceptable method with our goal to provide input such that we can accept the method as an alternative to the EPA method in future regulatory actions. For example, ASTM D6522-00 Standard Test Method for the Determination of Nitrogen Oxides,

Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers and Process Heaters Using Portable Analyzers has been cited as an alternative to EPA Method 3A for oxygen and Method 10 for carbon monoxide from natural gas fired units as part of the combustion turbine, internal combustion engine and boiler and process heater MACTs as well as for Method 3A, and Methods 7E and 20 (nitrogen oxides) in the NSPS subpart GG revision. ASTM D6348-03 (FTIR) has been cited as an alternative, for specific pollutants, to Method 320 in the combustion turbine, ICE, and Plywood, MACTs. ASTM D6420-99 Test Method for Determination of Gaseous Organic Compounds by Direct Interface Gas Chromatography/Mass Spectrometry has been cited as an alternative for Method 18 in the Lime, Organic Liquid Distribution, Reinforced Plastics Composites, Semiconductors, Cellulose, GMACT and Boat Building MACTs. ASTM D6735-01 Standard Test Method for Measurement of Gaseous Chlorides and Fluorides from Mineral Calcining Exhaust Sources - Impinger Method has been cited as an alternative to Method 320 for HCl in the lime MACT. **(Terry Harrison 919/541-5233, John Bosch 919/541-5583)**

5. **Emissions Factor Development and Application** - The Source Measurement and Analysis Group has been working on a new initiative to reinvent how emissions factors are developed and applied. In particular we are focusing on 1) establishing the basis for a self-sustaining emissions factors development process that produces emissions factor data of known quality; 2) promoting improvements and alternatives to emissions factors, including direct pollutant monitoring, for site-specific emissions quantification applications through the permitting and other air program activities; and 3) advancing the development and use of new and enhanced emissions factors implementation tools. **(Peter Westlin 919-541-1058)**